

MANAGING DEER AND HORSE FLIES

AND PREVENTING BITES

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Spending time outside introduces the chance of encountering tabanid flies, commonly known as deer and horse flies. While a significant livestock pest, tabanid flies are concerning to humans as both nuisance biters and disease vectors (capable of transmitting diseases). Therefore, understanding their biology and using protective strategies to reduce the risk of being bitten are important, especially since they are most active during daylight hours.

Biology

Family Tabanidae is split into two major subfamilies: Chrysopsinae (deer flies), and Tabaninae (horse flies). All tabanid flies undergo a complete metamorphosis, developing from egg, larva, pupa to adult. Dark egg masses, ranging from 100 to 1,000, are laid in layers on plants, rocks or sticks that are near water. Deer flies prefer depositing eggs in wet, saturated habitats, while horse flies prefer drier areas. After five to seven days, larvae hatch and move to nearby water or wet soil to further develop. Larvae taper towards both ends of their bodies and are usually white or gray in appearance but can be brown or green. Tabanid larvae may be either fully aquatic, semiaquatic or fully terrestrial during this stage, depending on species. Like mosquitoes, tabanid larvae breathe through tracheal siphons on the posterior ends of their bodies. Deer fly larvae feed upon decaying organic matter, while horse fly larvae are more predatory and feed on immature insects and other small arthropods. The entire larval stage for tabanids may last from a few months to a year, as they progress through six to nine developmental stages (instars). Pupation occurs in the soil and lasts two to three weeks, depending on outside temperature.

Adult tabanid flies vary in size, from small deer flies (about 6 mm) to large horse flies (about 30 mm). Tabanids possess short antennae and



Tabanid eggs. Photo by M.J. Hatfield, Bugguide.net



Larval American horse fly (*Tabanus americanus*). Photo by Sturgis McKeever, Georgia Southern University, Bugwood.org



Pupal American horse fly (*Tabanus americanus*). Photo by Sturgis McKeever, Georgia Southern University, Bugwood.org



Adult green horse fly (*Chlorotabanus crepuscularis*). Photo by Sturgis McKeever, Georgia Southern University, Bugwood.org

two prominent compound eyes, often patterned, solid-colored or brightly multicolored in life. Male tabanids are easily distinguished from females by their contiguous eyes, whereas the eyes of females are widely separated. Differentiation between the two subfamilies is challenging for most people, but generally horse flies are larger than deer flies.



Adult deer fly (*Chrysops pikei*). Photo by Sturgis McKeever, Georgia Southern University, Bugwood.org

Deer flies possess blunt, black or yellow abdomens, antennae longer than their heads, and patterned eyes. Horse flies possess pointed, black, green or grey abdomens, shorter antennae and colored eyes generally lacking a distinct pattern. Additionally, deer flies possess mottled wings with dark patches that horse flies lack.

Risk to Humans

Only female tabanid flies bite and draw blood from mammals (including humans). Blood is necessary as a source of protein for producing eggs and successful reproduction, similar to mosquitoes. Females lacerate the skin with their modified sawlike mouthparts and then use a spongelike appendage to suck up blood. Depending on species, females may bite up to 10 times per minute, producing visible bleeding wounds. Males cannot bite mammals and instead feed on nectar and pollen from plants. Females also feed on plant nectar. Unlike many other biting insects, bites from tabanid flies are felt and responded to immediately. This causes the female to try and again on the same host or visit others to obtain an adequate blood meal, increasing the likelihood of disease transmission. Horse flies, while capable of

delivering a painful bite, are not known to transmit human diseases. However, they do act as a prominent vector of several livestock diseases, including anthrax, anaplasmosis and equine infectious anemia. Along the Gulf Coast, over 35 species of tabanid flies are of economic concern due to injuries inflicted upon livestock. While generally only biting animals, they may occasionally bite humans when animals are not readily available. Tularemia is a disease of animals and humans caused by the bacterium *Francisella tularensis*, which may be mechanically transmitted by deer flies. However, ticks are a more important vector. Common symptoms of tularemia in humans include chest pains, cough, fever, skin ulcers and swelling of lymph glands. Some studies have suggested that tabanids may serve as potential vectors of anthrax and Lyme disease to humans, albeit in a limited capacity; however, this remains poorly documented.

Protection Strategies

Control and management of tabanid flies is generally difficult and ineffective. Chemical treatment is limited as their larval development sites are in aquatic or semiaquatic habitats, their habits are not well understood. Adult flies are highly mobile and resilient

to insecticide applications, which at best yield only minimal and short-lived reductions in fly activity. In Louisiana, Tabanids can be particularly abundant in forested areas, natural wetlands and artificial wetlands such as irrigated rice production environments. Tabanid flies are attracted to exhaled carbon dioxide (CO₂) from hosts, as well as shades of black, blue

and red. Some traps, such as CO₂ traps and sticky traps, work by exploiting their behavioral attraction to these stimuli. Newer methods, such as using decoy dragonflies in a scarecrow-like manner, may work but lack supporting evidence on their efficacy. Avoiding tabanid flies can be challenging while engaging in outdoor activities due to their daytime activity, however the potential for bites can be minimized. The most effective protective strategy in tabanid-prone areas is to wear thick, long-sleeved shirts, durable

pants and a protective hat, thereby minimizing skin exposure and reducing the possibility of bites. Insect repellents such as DEET may be useful for temporary relief, but the actual efficacy of those products against tabanid flies remains understudied. For animals, pyrethroid livestock pours and protective coverings may be used to minimize bites. Repellents, as well as selective grazing and confinement may also reduce the impact of tabanids on livestock.

Sources

Baldacchino, F., M. Desquesnes, S. Mihok, L.D. Foil, G. Duvallet, and S. Jittapalapong. 2014. Tabanids: Neglected subjects of research, but important vectors of disease agents! *Infection, Genetics and Evolution* 28: 596–615.

Bennett, G.W., J.M. Owens & R.M. Corrigan. 1997. *Truman's Scientific Guide to Pest Control Operations*, 5th ed. Advanstar Marketing Services/Purdue University Press, 520 pp. ISBN 0-929870-45-X.

Gulmahamad, H. 2011. Flies, Gnats, and Midges. In S.A. Hedges and D. Moreland (eds.), *Mallis handbook of pest control: the behavior, life history, and control of household pests*, 10th ed., pp. 1022-1023. GIE Media, Cleveland, OH.

Hill, C.A., and MacDonald, J.F. (2019). Horse and deer flies (Publication No. E-246, 4 pp.). University Extension Entomology, Purdue University.

Mullens, B.A. (2002). Horse flies and deer flies (Tabanidae). In G. Mullen & L. Durden (Eds.), *Medical and Veterinary Entomology* (pp. 263–277). Academic Press.

Sharma, R., R.D. Patil, B. Singh, S. Chakraborty, D. Chandran, K. Dhama, D. Gopinath, G. Jairath, A. Rialch, G. Mal, P. Singh, W. Chaicumpa, and G. Saikumar. 2023. Tularemia - a re-emerging disease with growing concern. *Veterinary Quarterly* 43: 1–16.

AUTHORS

Chance D. Hudnall, Graduate Student
Aaron R. Ashbrook, Assistant Professor of Urban and Peri-urban Entomology
Chris E. Carlton, Professor Emeritus

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